IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Craddock et al.**

Serial No.: **09/965,005**

Filed: **September 27, 2001**

For: **End Node Partitioning Using Virtualization**

Group Art Unit: **2194**

Examiner: **Nguyen, Van H.**

Attorney Docket No.: **AUS920010491US1**

35525
PATENT TRADEMARK OFFICE
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By: Michele Morrow
Michele Morrow

TRANSMITTAL OF APPEAL BRIEF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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- Appeal Brief (37 C.F.R. 41.37)

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Respectfully submitted,

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Facsimile Cover Sheet

To: Commissioner for Patents for **Examiner Van H. Nguyen** **Group Art Unit 2194**	Facsimile No.: **571/273-8300**
From: Michele Morrow Legal Assistant to Francis Lammes	No. of Pages Including Cover Sheet: **25**

Message:

Enclosed herewith:

- Transmittal of Appeal Brief; and
- Appeal Brief.

Re: Application No. **09/965,005**
Attorney Docket No: **AUS920010491US1**

Date: Tuesday, April 04, 2006

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Docket No. AUS920010491US1 *PATENT*

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APPEAL BRIEF (37 C.F.R. 41.37)

This brief is in furtherance of the Notice of Appeal, filed in this case on February 9, 2006.

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REAL PARTY IN INTEREST

The real party in interest in this appeal is the following party: International Business Machines Corporation.

RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interferences that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interferences.

STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 1-19.

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: NONE.
2. Claims withdrawn from consideration but not canceled: NONE.
3. Claims pending: 1-19.
4. Claims allowed: NONE.
5. Claims rejected: 1-19.
6. Claims objected to: NONE.

C. CLAIMS ON APPEAL

The claims on appeal are: 1-19.

STATUS OF AMENDMENTS

There are no amendments after the final rejection.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claims 1, 11, and 19:

The present invention provides a method for partitioning a computer network end node. (Specification, page 1, lines 409 and page 30, lines 28-30) The present invention virtualizes a plurality of network devices on a single multi-function chip by means of a combination of hardware and software to form virtual network devices. (Specification, page 23, lines 1-4) The present invention virtualizes at least one router on the single multi-function chip by means of a combination of hardware and software to form a virtual router. (Specification, page 23, line 3, to page 26, line 11) Wherein the virtual router of the present invention performs control-flow processing for the virtual network devices. (Specification, page 27, lines 8-25) Wherein the virtual router of the present invention functions of destination lookup and packet forwarding are incurred only on control-flow processing. (Specification, page 26, lines 12-29) Wherein the virtual network devices and the virtual router of the present invention form a virtual subnet. (Specification, page 23, line 5, to page 26, line 11)

The system recited in claim 19 may be a system for partitioning a computer network end node comprised of a first virtualizing component and a second virtualizing component, such as virtual host processor node 602, virtual host processor node 604, virtual host channel adapter (HCA) 606, or virtual host channel adapter (HCA) 608 of Figure 6 performing the steps described in the specification at page 22, line 29, to page 30, line 11 and page 30, lines 12-30, or equivalent. A person having ordinary skill in the art would be able to derive computer instructions on a computer readable medium as recited in claim 11, as well as dependent claims 12-18, given Figures 6 and 7 and the corresponding description at page 22, line 29, to page 30, line 11 and page 30, lines 12-30, without undue experimentation.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. GROUND OF REJECTION (Claims 1-19)

Claims 1-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Pettey et al. (U.S. Patent No. 6,594,712 B1) in view of Yuasa et al. (U.S. Patent No. 6,085,238).

ARGUMENT

A. 35 U.S.C. § 103, Alleged Obviousness, Claims 1-19

The Examiner rejects claims 1-19 under 35 U.S.C. § 103(a) as being unpatentable over Pettey et al. (U.S. Patent No. 6,594,712 B1) in view of Yuasa et al. (U.S. Patent No. 6,085,238). This rejection is respectfully traversed.

As to claims 1, 11 and 19, the Examiner states:

> As to claim 1, Pettey teaches the invention substantially as claimed including a method for partitioning a computer network end node (col. 6, lines 14-29), the method comprising:
>
> - virtualizing a plurality of network devices on a single multi-function chip by means of a combination of hardware and software to from network devices (col.6, lines 20-47 and fig.1); and
> - virtualizing at least one router on the multi-function chip by means of a combination of hardware and software to form a router (col.6, lines 22-27 and fig.1), wherein the virtual router performs control-flow processing for the virtual network devices (col. 6, lines 23-38 and figs. 7a-7b);
>
> wherein the virtual network devices and the router form a subnet (col.6, lines 31-38).
>
> Pettey does teach network devices, a router, a subnet, but does not explicitly teach a virtual network devices, a virtual router and a virtual subnet and the virtual router functions of destination lookup and packet forwarding are incurred only on control-flow processing.
>
> Yuasa teaches a virtual network devices (see the abstract), a virtual router (col.72, lines 14-30, a virtual subnet (col.39, lines 3-14), and the virtual router functions of destination lookup and packet forwarding are incurred only on control-flow processing (col.39, lines 16-34 and col.72, lines 14-41).
>
> It would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Yuasa and Pettey because Yuasa's teaching would have provided the capability of enabling highs peed routing for the intranet. Thus, system costs are drastically decreased and intranet routing performance can be enhanced.

Office Action dated July 14, 2005, pages 4-5.

Claim 1, which is representative of the other rejected independent claims 11, and 19 with regard to similarly recited subject matter, reads as follows:

> 1. A method for partitioning a computer network end node, the method comprising:

virtualizing a plurality of network devices on a single multi-function chip by means of a combination of hardware and software to form virtual network devices; and

virtualizing at least one router on the single multi-function chip by means of a combination of hardware and software to form a virtual router, wherein the virtual router performs control-flow processing for the virtual network devices, and wherein the virtual router functions of destination lookup and packet forwarding are incurred only on control-flow processing;

wherein the virtual network devices and virtual router form a virtual subnet.

Pettey and Yuasa, taken alone or in combination, fail to teach or suggest virtualizing a plurality of network devices **on a single multi-function chip** by means of a combination of hardware and software to form virtual network devices, virtualizing at least one router **on the single multi-function chip** by means of a combination of hardware and software to form a virtual router, wherein the virtual router performs control-flow processing for the virtual network devices, wherein the virtual router functions of destination lookup and packet forwarding are incurred only on control-flow processing, and wherein the virtual network devices and virtual router form a virtual subnet.

Pettey is directed to an Infiniband channel adapter for performing direct data transfers between a PCI bus and an Infiniband link without double-buffering the data in system memory. In the Pettey system, a local processor programs the channel adapter to decode addresses in a range of the PCI bus address space dedicated to direct transfers. When an I/O controller attached to the PCI bus transfers data from an I/O device to an address in the dedicated range, the channel adapter receives the data into an internal buffer and creates an Infiniband RDMA Write packet for transmission to virtual address within a remote Infiniband node. When the channel adapter receives an Infiniband RDMA Read Response packet, the channel adapter provides the packet payload data to the I/O controller at a PCI address in the dedicated range.

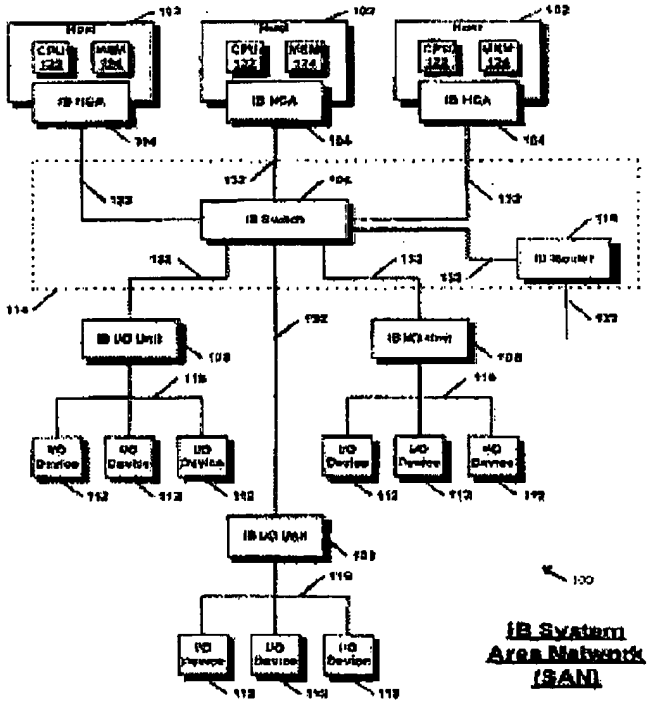
Thus, in the system of Pettey, the Infiniband channel adapter couples to an I/O controller via a local bus interface. The local bus interface receives data from the I/O controller if a local bus address of the data is within a predetermined address range of the local bus address space. The Examiner alleges that Pettey teaches virtualizing a plurality of network devices on a single multi-function chip by means of a combination of hardware and software to form virtual network devices, at column 6, lines 20-47, and Figure 1, which read and are shown as follows:

The hosts 102 are IB processor end nodes, such as server computers, that comprise at least a CPU 122 and memory 124 complex. Each of the hosts 102 includes one or more IB Host Channel Adapters (HCA) 104 for interfacing the hosts 102 to an IB fabric 114. The IB fabric 114 is comprised of one or more IB Switches 106 and IB Routers 118 connected by a plurality of IB serial links 132. For example, an HCA 104 may be coupled to a host 102 via a PCI bus or the HCA 104 may be coupled directly to the memory and/or processor bus of the host 102.

The SAN 100 also includes a plurality of IB I/O units 108 coupled to the IB fabric 114. The IB hosts 102 and IB I/O units 108 are referred to collectively as IB end nodes. The IB end nodes are coupled by the IB switch 106 that connects the various IB links 132 in the IB fabric 114. The collection of end nodes shown comprises an IB subnet. The IB subnet may be coupled to other IB subnets (not shown) by the IB router 118 coupled to the IB switch 106.

Coupled to the I/O units 108 are a plurality of I/O devices 112, such as disk drives, network interface controllers, tape drives, CD-ROM drives, graphics devices, etc. The I/O units 108 may comprise various types of controllers, such as a RAID (Redundant Array of Inexpensive Disks) controller. The I/O devices 112 may be coupled to the I/O units 108 by any of various interfaces, including SCSI (Small Computer System Interface), Fibre-Channel, Ethernet, IEEE 1394, etc.

(Column 6, lines 20-47)



(Figure 1)